

Checklist for Manufactured Septic Tank Review

Manufacturer _____
Tank Model _____

R317-4-7-3

- ☐ Plans showing all dimensions, capacities, reinforcing, and other pertinent data.
- ☐ Certification from the manufacturer that the tanks comply with the rule.
- ☐ Evaluation on each tank from a registered engineer.

R317-4-7-6

- ☐ Minimum 3" thick sidewalls and bottom.
- ☐ Minimum 4" thick top.
- ☐ Minimum reinforcing of 6" x 6" No. 6, welded wire fabric, or equivalent.
- ☐ Class A, 4000 psi concrete used.

R317-4-7-10

- ☐ Appropriate identifying marks on the exterior of the tank.
- ☐ Name and address or nationally registered trademark of the manufacturer.
- ☐ The liquid capacity of the tank in gallons.
- ☐ Both the inlet and outlet, marked accordingly.

R317-4-7-11

- ☐ Liquid depth of the tank to be between 30" and 72".

R317-4-7-12

- ☐ The first compartment volume ☐ equal to or ☐ exceed two-thirds of the total required septic tank volume.
- ☐ No compartment to have internal horizontal distance less than 24".
- ☐ Minimum opening dimension between compartments is 4", cross sectional area ≥ 6 " diameter pipe.
- ☐ The mid-point of the opening is approximately 40% of the liquid depth.
- ☐ No more than 3 compartments.

R317-4-7-14

- ☐ The inlet invert must be at least 2" above the outlet invert. (Preferable 3")
- ☐ The inlet baffle or tee is to penetrate the liquid level at least 6".
- ☐ The outlet shall extend ~40% of the liquid depth. **(Vertical side tanks)**
- ☐ The outlet shall extend ~35% of the liquid depth. **(Other shapes)**
- ☐ Inlets or outlets shall not prevent venting. **(Minimum 1" space)**
- ☐ The top of the baffle must extend above the liquid at least 6".

R317-4-7-15

- ☐ Minimum scum storage volume of 15% or more, of the liquid volume.

R317-4-7-17

- ☐ 18" minimum opening into each compartment of the tank.
- ☐ Minimum 12" opening to the inlet and outlet.

R317. Environmental Quality, Water Quality.

R317-4-7. Septic Tanks.

7.1. General Requirements.

A. Septic tanks shall be constructed of sound, durable, watertight materials that are not subject to excessive corrosion, frost damage, or decay. They shall be designed to be watertight, and to withstand all expected physical forces, to provide settling of solids, accumulation of sludge and scum, and be accessible for inspection and cleaning as specified in the following paragraphs:

B. Illustrations of typical absorption system components such as septic tanks, distribution boxes, and absorption systems are contained in an addendum to these rules, available through the Division of Water Quality.

7.2. Overall Construction and Design Features.

A. Septic tanks may be constructed of the following:

1. Precast reinforced concrete
2. Fiberglass
3. Polyethylene
4. Poured-in-place concrete
5. Material approved by the Division

B. Septic tanks may have single or multiple compartments and may be oval, circular, rectangular, or square in plan, provided the distance between the inlet and outlet of the tank is at least equal to the liquid depth of the tank. In general, the tank length should be at least two to three times the tank width.

C. All septic tanks may have an effluent filter installed at the outlet of the tank. The filter shall prevent the passage of solid particles larger than a nominal 1/8 inch diameter sphere. The filter should be easily removed for routine servicing through watertight access from the ground surface, or be bypassed with a piping arrangement.

7.3. Plans for Tanks Required.

A. Plans for all septic tanks shall be submitted to the regulatory authority for approval. Such plans shall show all dimensions, capacities, reinforcing, and such other pertinent data as may be required. All septic tanks shall conform to the design drawings and all building shall be done under strict controlled supervision by the manufacturer.

B. Commercial septic tank manufacturers shall submit design plans for each tank model manufactured to the Division for review and approval. The manufacturer shall certify in writing to the Division that the septic tanks to be distributed for use in the State of Utah will comply with this regulation. It is recommended that such plans also be evaluated by a registered engineer as to surcharge, impact load, and deadload. Any changes in the design of commercially manufactured septic tanks shall be submitted to the Division for approval.

7.4. Tank Capacity for Single-Family Dwellings. The minimum liquid capacity of septic tanks serving single-family dwellings shall be based on the number of bedrooms in each dwelling, in accordance with Table 6.

TABLE 6
Minimum Capacities for Septic Tanks(a)

Number of Bedrooms(b)	Minimum Liquid Capacity(c)(d) (Gallons)
1	750
2 or 3	1000
4	1250
For each additional bedroom, add	250

FOOTNOTES

(a) Tanks larger than the minimum required capacity are generally more economical since they do not have to be cleaned as often.

(b) Based on the number of bedrooms in use or that can be reasonably anticipated in the dwelling served, including the unfinished space available for conversion as additional bedrooms. Unfinished basements shall be counted as a minimum of one additional bedroom.

(c) The liquid capacity is calculated on the depth from the invert of the outlet pipe to the inside bottom of the tank. A variance of three percent in the required volume may be allowed.

(d) Table 6 provides for the normal household appliances, including automatic sequence washers, mechanical garbage grinders, and dishwashers.

7.5. Tank Capacity for Commercial, Institutional, and Recreational Facilities, and Multiple Dwellings.

A. The minimum liquid capacity of septic tanks serving commercial, institutional, and recreational facilities, and multiple dwellings shall be determined on the following basis:

1. For wastewater flows up to 500 gallons per day, the liquid capacity of the tank shall be at least 750 gallons.

2. For wastewater flows between 500 and 1,500 gallons per day, the liquid capacity of the tank shall be at least 1.5 times the 24-hour estimated sewage flow (see Table 3).

3. For wastewater flows between 1,500 and 5,000 gallons per day, the liquid capacity of the tank shall equal at least 1,125 gallons plus 75 percent of the daily wastewater flow ($V = 1,125 + 0.75Q$ where V = liquid volume of the tank in gallons, and Q = wastewater discharge in gallons per day).

B. In cases where dwellings or facilities are subject to high peak sewage flows, the liquid capacity of the onsite wastewater system shall be increased as required by the regulatory authority.

7.6. Precast Reinforced Concrete Septic Tanks.

A. The walls and base of precast tanks shall be securely bonded together and the walls shall be of monolithic or keyed construction. The sidewalls and bottom of such tanks shall be at least 3 inches in thickness. The top shall have a minimum thickness of four inches. Such tanks shall have reinforcing of at least six inch x six inch No. 6, welded wire fabric, or equivalent. Exceptions to this reinforcing requirement may be considered by the Division based on an evaluation of acceptable structural engineering data submitted by the manufacturer. All concrete used in precast tanks shall be Class A, at least 4,000 pounds per square inch, and shall be vibrated or well-rodged to minimize honeycombing and to assure reasonable watertightness. Precast sections shall be set evenly in a full bed of sealant. If grout is used it shall consist of two parts plaster sand to one part cement with sufficient water added to make the grout flow under its own weight. Excessively mortared joints should be trimmed flush. The inside and outside of each mortar joint shall be sealed with a waterproof bituminous sealing compound.

B. For the purpose of early reuse of forms, the concrete may be steam cured. Other curing by means of water spraying or a membrane curing compound may be used and shall comply to best acceptable methods as outlined in "Curing Concrete, ACI308-71," by American Concrete Institute, P.O. Box 19150, Detroit, Michigan 48219.

7.7. Fiberglass Septic Tanks.

A. Fiberglass septic tanks shall comply with the criteria for acceptance established in the "Interim Guide Criteria For Glass-Fiber-Reinforced Polyester Septic Tanks", International Association of Plumbing and Mechanical Officials, 5032 Alhambra Avenue, Los Angeles, California 90032. The identifying seal of the International Association of Plumbing and Mechanical Officials must be permanently embossed in the fiberglass as evidence of compliance. The design requirements in R317-4-7 shall also be met. Other required identity marks must also comply with this rule.

B. Inlet and outlet tees shall be attached to the tank by a rubber or synthetic rubber ring seal and compression plate, or in some other manner approved by the Division.

C. The tank shall be installed in accordance with the manufacturer's recommendations. If no such recommendations are provided, the following installation procedures shall apply:

1. During installation, careful handling of the tank is necessary to prevent damage. Tanks shall not be

installed under areas subject to vehicular traffic or heavy equipment.

2. There shall be a minimum of twelve inches of approved, compacted backfill material under the tank as a resting bed. The resting bed must be smooth and level.

3. The hole that the tank is to be installed in shall be large enough to allow a minimum of twelve inches from the ends and sides of the tank to the hole wall.

4. Approved backfill material shall be a naturally-rounded aggregate, clean and free flowing, with a particle size of 3/8-inch or less in diameter. Crushed stone or gravel of the same particle size may be used if naturally-rounded aggregate is not available, but should be washed and free flowing.

5. Backfilling shall be accomplished to the top of the tank in twelve -inch lifts with each layer being well compacted. Sharp tools should not be used near the septic tank. With the manhole cover(s) in place, water should be added to the tank during backfilling. The water level in the tank should coincide approximately with the backfill depth. With the tank full of water, the excavation should be brought to grade with the same approved backfill materials. Depth of backfill over the top of the tank shall not exceed 2-1/2 feet.

7.8. Polyethylene Septic Tanks.

A. Polyethylene septic tanks shall comply with the criteria for acceptance established in "Prefabricated Septic Tanks and Sewage Holding Tanks, Can3-B66-M79" by the Canadian Standards Association, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W1R3. Required identifying marks shall comply with this rule.

B. Inlet and outlet tees shall be attached to the tank by a rubber or synthetic rubber ring seal and compression plate, or in some other manner approved by the Division.

C. The tank shall be installed in accordance with the manufacturer's recommendations. If no such recommendations are provided, the installation procedures in R317-4-7 shall apply.

7.9. Poured-In-Place Concrete Septic Tanks. The top of poured-in-place septic tanks with a liquid capacity of 750 to 1,250 gallons shall be a minimum of four inches thick, and reinforced with one 3/8-inch reinforcing rod per foot of length, or equivalent. The top of tanks with a liquid capacity of greater than 1,250 gallons up to the maximum design capacity shall be a minimum of six inches thick, and reinforced with 3/8-inch reinforcing rods eight inches on centers both ways, or equivalent. The walls and floor shall be a minimum of six inches thick. The walls shall be reinforced with 3/8-inch reinforcing rods eight inches on centers both ways, or equivalent. Inspections by the regulatory authority may be required of the tank reinforcing steel before any concrete is poured. A six-inch water stop shall be used at the wall-floor juncture to insure watertightness. All concrete used in poured-in-place tanks shall be Class A, at least 4,000 pounds per square inch, and shall be vibrated or well-rodged to minimize honeycombing and to insure watertightness. Curing of concrete shall comply with the requirements in R317-4-7.

7.10. Identifying Marks. All prefabricated or precast septic tanks which are commercially manufactured shall be plainly, legibly, and permanently marked or stamped on the exterior at the outlet end and within six inches of the top of the wall, with the name and address or nationally registered trademark of the manufacturer and the liquid capacity of the tank in gallons. Both the inlet and outlet of all such tanks shall be plainly marked as IN or OUT, respectively.

7.11. Liquid Depth of Tanks. Liquid depth of septic tanks shall be at least 30 inches. Depth in excess of 72 inches shall not be considered in calculating liquid volume required in R317-4-7.

7.12. Tank Compartments. Septic tanks may be divided into compartments provided each meets applicable requirements stated herein as well as the following:

A. The volume of the first compartment must equal or exceed two thirds of the total required septic tank volume.

B. No compartment shall have an inside horizontal distance less than 24 inches.

C. Inlets and outlets shall be designed as specified for tanks, except that when a partition wall is used to form a multi-compartment tank, an opening in the partition may serve for flow between compartments provided the minimum dimension of the opening is four inches, the cross-sectional area is not less than that of a six -inch diameter pipe (28.3 square inches), and the mid-point is below the liquid surface a distance approximately equal to 40 percent of the liquid depth of the tank.

D. No tank shall have an excess of three compartments.

7.13. Tanks in Series. Additional septic tank capacity over 750 gallons may be obtained by joining

uncompartmented tanks in series to obtain the required capacity providing the following are complied with:

- A. No tank in the series shall be smaller than 750 gallons.
- B. The capacity of the first tank shall be at least two thirds of the required total septic tank volume.
- C. The outlet of each successive tank shall be at least 2 inches lower than the outlet of the preceding tank, and shall be unrestricted except for the inlet to the first tank and the outlet for the last tank.
- D. The number of tanks in series shall not exceed three.

7.14. Inlets and Outlets. Inlets and outlets of tanks or compartments thereof shall meet the material and minimum diameter requirements for building sewers and shall be tee-ed or baffled with the object of diverting incoming flow toward the tank bottom and minimizing as much as possible the discharge of sludge or scum in the effluent. Inlet or outlet devices shall also conform with the following:

A. Inlets and outlets should be located on opposite ends of the tank. The invert of flow line of the inlet shall be located at least two inches (and preferably three inches) above the invert of the outlet to allow for momentary rise in liquid level during discharge to the tank.

B. An inlet baffle or sanitary tee of wide sweep design shall be provided to divert the incoming sewage downward. This baffle or tee is to penetrate at least six inches below the liquid level, but the penetration is not to be greater than that allowed for the outlet device.

C. For tanks with vertical sides, outlet baffles or sanitary tees shall extend below the liquid surface a distance equal to approximately 40 percent of the liquid depth. For horizontal cylindrical tanks and tanks of other shapes, that distance shall be reduced to approximately 35 percent of the liquid depth.

D. All baffles shall be constructed from sidewall to sidewall or shall be designed as a conduit.

E. All inlet and outlet devices shall be permanently fastened in a vertical, rigid position. Inlet and outlet pipe connections to the septic tank shall be sealed with a bonding compound that will adhere to the tank and pipes to form watertight connections, or watertight sealing rings.

F. Inlet and outlet devices shall not include any design features preventing free venting of gases generated in the tank or absorption system back through the roof vent in the building plumbing system. The top of the baffles or sanitary tees must extend at least six inches above the liquid level in order to provide scum storage, but no closer than one inch to the inside top of the tank.

G. Offset inlets may be approved by the regulatory authority where they are warranted by constraints on septic tank location.

H. Multiple outlets from septic tanks shall be prohibited.

I. A gas deflector may be added at the outlet of the tank to prevent solids from entering the outlet pipe of the tank.

7.15. Scum Storage. Scum storage volume shall consist of 15 percent or more of the required liquid capacity of the tank and shall be provided in the space between the liquid surface and the top of inlet and outlet devices.

7.16. Accessibility of Tank. Septic tanks shall be installed in a location so as to be accessible for servicing and cleaning, and shall have no structure or other obstruction placed over them so as to interfere with such operations. Tanks should be placed between the dwelling and the street whenever possible to facilitate connection to the sanitary sewer at the time such a sewer is installed.

7.17. Access to Tank Interior. Adequate access to the tank shall be provided to facilitate inspection and cleaning and shall conform to the following requirements:

A. Access to each compartment of the tank shall be provided through properly placed manhole openings not less than 18 inches, preferably 22 inches, in minimum horizontal dimension or by means of an easily removable lid section.

B. Access to inlet and outlet devices shall be provided through properly spaced openings not less than twelve (12) inches in minimum horizontal dimension or by means of an easily removable lid section.

C. The top of the tank shall be at least six inches below finished grade.

D. All manholes required by R317-4-7. shall be extended to within at least four inches of the finished grade. The manhole extensions shall be constructed of durable, structurally sound materials which are approved by the regulatory authority and designed to withstand expected physical loads and corrosive forces.

E. Access covers for manhole openings shall have adequate handles and shall be designed and

constructed in such a manner that they cannot pass through the access openings, and when closed will be child-proof and prevent entrance of surface water, dirt, or other foreign material, and seal the odorous gases in the tank.

F. No septic tank shall be located under paving unless extensions to the access openings are extended up through the paving and the manholes are equipped with a locking-type cover.

7.18. Tank Cover. Septic tank covers shall be sufficiently strong to support whatever load may reasonably be expected to be imposed upon them and tight enough to prevent the entrance of surface water, dirt, or other foreign matter, and seal the odorous gases of digestion.

7.19. Tank Excavation and Backfill. The hole to receive the tank shall be large enough to permit the proper placement of the tank and backfill. Tanks shall be installed on a solid base that will not settle and shall be level. Where rock or other undesirable protruding obstructions are encountered, the bottom of the hole should be excavated an additional six inches and backfilled with sand, crushed stone, or gravel to the proper grade. Backfill around and over the septic tank shall be placed in such a manner as to prevent undue strain or damage to the tank or connected pipes.

7.20. Installation in Ground Water. If septic tanks are installed in ground water, the regulatory authority may require adequate ground anchoring devices to be installed to prevent the tank from floating when it is emptied during cleaning operations.

7.21. Maintenance Requirements. Maintenance Requirements - Adequate maintenance shall be provided for septic tanks to insure their proper function. Recommendations for the inspection and cleaning of septic tanks are provided in R317-4-13.